

- (5) The anterior abdominal vein always arises from one afferent renal, rarely from both as in the Saurians. Frequently, also, it is double.
- (6) The existence of veins continuing the azygos posteriorly is usual.

Facts which are of importance for the systematic arrangement of genera and species within the family Boidæ:—

- (1) The Boinæ (*Eunectes* and *Eryx*) differ from the Pythoninæ (*Python*) in that the intercostals are posteriorly paired arteries, while in the Pythoninæ a single median artery divides into two close to the median dorsal line throughout the series.
- (2) The three species *Eryx conicus*, *E. johni*, and *E. jaculus* differ from each other in a large number of anatomical features.

Besides these points several other anatomical features are of interest as new or rare among Ophidia. Such are

- (1) The continuation of the afferent renal of the left kidney in *Zamenis gemonensis* beyond the kidney into the parietes, as in *Chamaeleon* and *Pygopus*.
- (2) The origin of œsophageal arteries not only from the left aortic arch but from some of the intercostals of the right half arch.
- (3) The fusion of some of the anterior intercostals in *Eryx jaculus* (and *Python spilotes*) to form a continuous longitudinal trunk lying dorsally of the aorta.
- (4) Representatives of the lateral abdominal vein of Lizards appear to exist in certain snakes (e. g. *Eunectes* and *Eryx*).
- (5) Origin of a fat-body artery in *Eryx johni* from an intercostal.

4. On Entomostraca collected in Natal by Mr. James Gibson.

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(Plates VI.—VIII.)*

For the opportunity of examining and describing these species I am indebted to the kindness of Mr. James Gibson, Resident Magistrate at Greytown, by whom they were collected in the summer of 1902. All are freshwater species, and were found in pools in the neighbourhood of Greytown, Natal. The identity of some of them with European forms is a point of considerable interest, and indeed the general aspect of the gatherings is quite

* For explanation of the Plates, see p. 127.

similar to what one would expect in ordinary Northern collections. With the exception of one species, for which I have thought it best to propose a new generic name—*Ectocyclops*—all are referable to familiar European genera.

CYCLOPS LEUCKARTI Claus.

This appears to be less plentiful in the Natal gatherings than any of the following species, though more conspicuous owing to its greater size.

The form described by me years ago under the specific name *scourfieldi** has been identified by other authors (Lilljeborg, Herrick, Schmeil) with *C. leuckarti* Claus. I am doubtful as to the correctness of this identification. Both Schmeil† and Herrick‡ figure, with differences, peculiar pellucid marginal laminae on the last two joints of the larger antennae. I have been unable to detect any such structure in my British specimens of *C. scourfieldi*, neither does it exist in the Natal specimens nor in others from Ceylon which I refer to the same species. And it may be noted that Lilljeborg, while accepting Schmeil's description and figures as belonging to *C. leuckarti*, does not himself refer in his definition to these antennal laminae. Herrick, on the other hand, figures and describes them, and expresses a doubt as to the identity of the species with *C. scourfieldi*. I do not myself possess authentic specimens of *C. leuckarti*, and must be content for the present to leave the question in suspense.

CYCLOPS PUSILLUS, n. sp. (Plate VI. figs. 11–18.)

Female. Body slender, tapering gradually from before backwards (fig. 11); thoracic segments not produced at the angles, except the last which is extremely short and angulated: abdomen very slender, the first segment nearly as long as the united lengths of the following three segments; furcal segments slender, scarcely longer than the preceding abdominal segment; principal tail-seta nearly as long as the whole abdomen. Ovisacs closely adpressed to the abdomen and containing only a few comparatively large eggs. Antennules twelve-jointed, slender, somewhat longer than the entire cephalothorax, bearing numerous long setae (fig. 12). All the branches of the first four pairs of feet three-jointed; spines of the first pair (fig. 17) very slender and setiform; fifth pair (fig. 18) rudimentary, almost obsolete, consisting of a minute papilla from which arise two unequal setae. Length, exclusive of tail-setae, 0.46 mm.

This is the smallest species of *Cyclops* with which I am acquainted. But its general development and the fact of many specimens bearing ova, indicate that it is not an immature form.

* Brady, G. S. "A Revision of the British Species of Freshwater Cyclopidae and Calanidae" (Nat. Hist. Trans. Northumberland & Durham, vol. xi., 1891).

† Schmeil, Deutschlands freilebende Süßwasser-Copepoden. 1 Teil, Cyclopidae. 1892.

‡ Herrick, Synopsis of the Entomostraca of Minnesota, 1895.

CYCLOPS GIBSONI, n. sp. (Plate VI. figs. 1-10.)

Female. Seen dorsally the outline is slender, gradually tapering from before backwards, greatest width equal to about one-third of the length (fig. 1); the second segment as wide as the cephalic segment, slightly produced and angulated posteriorly, third segment narrower and scarcely at all produced at the angles, fourth segment again narrower and without produced angles; last thoracic segment about as wide as the fourth from side to side, but much narrowed from before backward, its lateral angles distinctly produced and bearing a brush of six or eight rather long setæ; abdominal segments gradually tapering backwards, the combined lengths of the second and third equal to that of the fourth, first segment rather larger than the fourth; caudal stylets slender (fig. 10), nearly equal in length to the abdomen, about five times as long as broad; the innermost of the two apical setæ is the longer and is about equal in length to the entire abdomen, outer setæ somewhat shorter; the subsidiary setæ are three in number, short, subequal, and arise from the apices of the stylets; on the side of each stylet not far from the distal end is a single very minute seta; the larger setæ are very finely plumose. The antennules are twelve-jointed (fig. 2), slender, bearing numerous setæ, and reach backwards as far as to the front of the second segment: the proportionate lengths of the joints are indicated in the following formula:—

1.	2.	3.	4.	5.	6.	7.	8.	9.	10.	11.	12.
3	1½	1	2	1½	1	2	4	3	3	3½	4.

The mandible is of the usual form, with a rudimentary palp of three setæ, two long and one short (fig. 3); the chewing portion of the maxilla (fig. 4) is of normal shape, with a laminar palp bearing several plumose setæ. The rami of the first four pairs of feet are all three-jointed; terminal joint of the outer branch of the first pair bearing two slender spines on the outer margin, three long setæ on the inner margin and two shorter apical setæ, the outermost being finely bipectinate (fig. 7); the terminal joint of the inner branch has one long apical spine and on its outer margin one very short spine and one slender seta, its internal margin has three setæ and one at the apex. The second, third, and fourth pairs (fig. 8) are nearly similar, but with more elongated joints and more robust spinous armature. The fifth pair (fig. 9) is uniaarticulate, with three subequal setæ, the innermost of which is densely plumose. Length 1 mm.

Among European species those most nearly allied to *C. gibsoni* seem to be *C. varicans*, *C. bicolor* G. O. Sars and *C. gracilis* Lilljeborg; but all of these have the rami of the swimming-feet uniformly biarticulate, whereas in *C. gibsoni* they are triarticulate.

CYCLOPS FIMBRIATUS Fischer.

This appears to be one of the commonest species in Mr. Gibson's

collection, agreeing down to the minutest details with British specimens.

ECTOCYCLOPS, nov. gen.

Like *Cyclops* except that the mandibles, maxillæ, and maxillipeds are less fully developed and are very indistinctly jointed, the posterior antenna bears a very stout ciliated seta on the posterior margin, and the terminal joints of the rami of the swimming-feet are scarcely at all elongated.

ECTOCYCLOPS RUBESCENS, n. sp. (Plate VI. figs. 19-20; Plate VII. figs. 21-27.)

Female. Body depressed, rather robust (fig. 19); cephalothoracic segments not produced laterally; abdominal segments short and stout, posterior margin of the last segment pectinated, furcal segments not much longer than broad; principal tail-setæ marginally aculeated, the innermost nearly equalling three-fourths of the length of the body; ovisacs large and adpressed. Antennules (fig. 20) ten-jointed, much shorter than the first cephalothoracic segment, and rather densely setiferous; antennæ (fig. 21) robust, anterior margin fringed towards the base with numerous short setæ, penultimate joint with about six larger setæ, terminal joint with several longer setæ; on the posterior margin rising from the base of the second joint is a very long and stout ciliated appendage. Mandibles bearing a rudimentary palp consisting of three very small setæ; maxillæ (fig. 22) not much different from those of *Cyclops*; anterior and posterior maxillipeds (figs. 23, 24) small, stout, and indistinctly jointed, the marginal curved teeth of the anterior pair very robust; rami of the swimming-feet three-jointed (figs. 25, 26), fifth pair obsolete, represented only by three short plumose setæ (fig. 27). Colour of the posterior part of the body faint reddish-brown, the anterior part nearly colourless (in spirit specimens). Length 0·85 mm.

ATTHEYELLA NATALIS, n. sp. (Plate VII. figs. 28-33.)

Female. In general outline like *Canthocamptus* (fig. 28). First thoracic segment coalescent with the head; posterior abdominal segments spinulose on the hinder margin; furca very short; principal tail-setæ equal to at least half the length of the body. Antennules slender, nine-jointed (fig. 29), shorter than the first cephalothoracic segment, and very sparingly setiferous; antennæ (fig. 30) bearing a minute one-jointed secondary branch. First pair of swimming-feet (fig. 31) short, both branches three-jointed, outer about equal in length to the first two joints of the inner branch; second, third, and fourth pairs having the outer branch composed of three, the inner of one joint (fig. 32); fifth pair (fig. 33) foliaceous, two-jointed, basal joint wide and bearing four long setæ on its inner and one on the outer lobe, terminal joint ovate and bearing three unequal apical setæ. Length 0·75 mm.

CYPRIA CASTANEA, n. sp. (Plate VII. figs. 40-42; Plate VIII. fig. 43.)

? *Cypria lacustris* Lilljeborg.

Shell, seen from the side, subovate (almost semicircular), highest in the middle, height equal to nearly two-thirds of the length (fig. 40); extremities broadly rounded, the anterior bordered by a narrow translucent fillet, dorsal margin boldly and evenly arched, ventral nearly straight: seen from above (fig. 41) the outline is narrowly ovate, widest behind the middle, width equal to more than one-third of the length, tapered to an acute point in front, rounded behind. Surface perfectly smooth and polished; colour reddish-brown, without any trace of hairs or sculpture. Length 0.65 mm. Limbs closely resembling those of *C. ophthalmica*, but much more slender, both as regards bulk and armature (figs. 42, 43.)

This seems to me to approach most nearly to *C. lacustris* Lilljeborg, if indeed that be truly a distinct species, and there is not much to separate it from the common Northern species *C. ophthalmica*, except the absence of shell-markings and the much more slender build of the limbs, of the post-abdominal claws, and of the antennal setæ. The specific name now proposed must, however, be looked upon as merely provisional.

CYPRIS INERMIS, n. sp. (Plate VIII. figs. 44-49.)

Shell, seen from the side, oblong-ovate (fig. 44), rather higher in front than behind, height equal to less than one-half the length, dorsal margin gently arched, ventral slightly sinuated; anterior extremity evenly rounded, posterior very much narrower and rounded; extremities and ventral margin fringed with fine hairs: seen from above (fig. 45) the outline is ovate, greatest width about equal to the height and situated near the middle, lateral margins evenly arcuate, extremities evenly rounded, the anterior rather the broader of the two. In young specimens the postero-inferior angle of the right valve bears two sharp teeth (fig. 46). Colour of the shell greyish white. Length 0.95 mm.

The antenna (fig. 47) bears a brush of four setæ which reach as far as the extremities of the very slender terminal claws. Apex of the second foot bearing a single slender curved claw (fig. 48) and a long seta. Post-abdominal rami (fig. 49) long and slender, finely ciliated on the hinder margin; all the setæ slender and crowded together apically, of these two are stouter than the rest and marginally pectinated.

This species occurred abundantly in one of Mr. Gibson's gatherings, less plentifully in another.

CYPRIS ARATRA, n. sp. (Plate VII. figs. 34-38.)

Shell, seen from the side (fig. 34), subovate, highest in the middle, height equal to more than half the length; anterior extremity broadly and rather obliquely rounded, posterior much narrower

and less distinctly rounded off; dorsal margin boldly arched, sloping more steeply behind than in front, ventral feebly convex, with no trace of sinuation: seen from above (fig. 35) the outline is very broadly ovate, widest in the middle, width equal to nearly three-fourths of the length, extremities obtusely pointed, the left valve larger and overlapping the right both in front and behind. Surface of the shell marked throughout with delicate and closely-set longitudinal furrows and bearing scattered hairs of variable length. Colour dusky greenish grey. Length 1.0 mm.

The antennæ bear fascicles of setæ reaching to the extremity of the claws, exactly as in the preceding species; second pair of feet with a slender terminal claw (figs. 36, 37), one long seta and several small claw-like processes*; post-abdominal rami (fig. 38) extremely slender, bearing two apical setæ and one much smaller lateral seta situated not very far from the apex.

The armature of the second pair of feet is here very different from that of a typical *Cypris*, but this character seems insufficient to give it separate generic rank.

STENOCYPRIS PERARMATA, n. sp. (Plate VIII. figs. 50-57.)

Shell, seen from the side (fig. 50), elongated, siliquose, greatest height equal to rather more than one-third of the length and situated in the middle; anterior extremity evenly rounded, posterior suddenly tapered, narrow and rounded off below; dorsal margin arcuate, sloping evenly toward the front, more abruptly and with a slight sinuosity behind, ventral slightly sinuated near the front but having a longer, shallow sinuation in the middle: seen from above (fig. 51) the outline is extremely compressed and elongated, quite four times as long as broad, obtusely pointed in front, acuminate behind. Surface smooth, slightly setiferous at the extremities; structure thin and membranaceous †. Length 1.6 mm.

Antepenultimate joint of the antennæ (fig. 52) bearing a small fascicle of setæ, two of which are longer than the rest, reaching beyond the bases of the terminal claws; mandibles (fig. 53) of the usual form, the biting portion armed with numerous strong teeth; maxillæ (fig. 54) having four slender, elongated lobes, two of the claws of the second lobe strongly denticulate (fig. 55); terminal claw of the first foot very long and slender, second foot (fig. 56) bearing a falcate terminal claw and a very long seta; post-abdominal rami (fig. 57) slender, bearing two long, strongly pectinated terminal claws and one very slender seta, and on the dorsal margin towards the apex armed with a series of about nine or ten strong spines with smaller setæ in the intervals; genital lobes very similar to those of *Herpetocypris* and other parthenogenetic Cyprididæ.

* The second foot of *Cypris ornata*, a rare British species, is very similar to this, and is figured in Plate VII. fig. 39.

† The specimens, as I received them, had been for a length of time in a formalin preservative, which may perhaps have led to the disappearance of calcareous structures.

This interesting species seems to occupy an intermediate position between *Herpetocypris* and *Stenocypris* so far as the antennal setæ, at least, are concerned, but from the shell-characters alone one would undoubtedly assign it to *Stenocypris*. Professor G. O. Sars in his description of *S. chevreuixii* mentions the "partly denticulated" spines of the lobes of the first pair of maxillæ, but does not figure them, and the antennal setæ of that species are certainly much more fully developed both as to length and number than in *S. perarmata*. These points I have been able to confirm from an examination of British specimens of *S. chevreuixii*, which I have been fortunate enough to find in several localities:—very sparingly in a pond at Pike's Hill, and in the Hatchet Pond, both near Lyndhurst, and more recently in considerable quantity in ditches near the River Arun at Arundel, Sussex. Figures of the shell, antenna, and post-abdomen of *S. chevreuixii* are given in Plate VIII. figs. 58–62.

MACROTHRIX AFFINIS, n. sp. (Plate VIII. figs. 63–65.)

Body short, length about one-third greater than the breadth (fig. 63). Head short and obtuse, with a rounded angle to which the antennules are attached; dorsal margin gently arched, obscurely angulated at its junction with the posterior margin which is finely denticulated, ventral margin convex and fringed with rather long hairs: antennules (fig. 64) club-shaped, slightly dilated and truncated distally, crenulated on the outer margin which bears a few cilia, as also does the truncated extremity. Post-abdomen (fig. 65) spinulose along the whole of its posterior border and having a short terminal hooked claw. The antennæ have the normal structure, not presenting any special characters, nor does the shell exhibit any definite ornament or sculpture. Length 0.32 mm.

This is a very small species, and is not very unlike the Northern *M. laticornis*, though only about half its size.

EXPLANATION OF THE PLATES.

PLATE VI.

Cyclops gibsoni, ♀, p. 123.

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| Fig. 1. Seen from above. | Fig. 6. Posterior footjaw. |
| 2. Antennule. | 7. Foot of first pair. |
| 3. Mandible. | 8. Foot of third pair. |
| 4. Maxilla. | 9. Foot of fifth pair. |
| 5. Anterior footjaw. | 10. Furca. |

Cyclops pusillus, ♀, p. 122.

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|---------------------------|----------------------------|
| Fig. 11. Seen from above. | Fig. 15. Anterior footjaw. |
| 12. Antennule. | 16. Posterior footjaw. |
| 13. Antenna. | 17. Foot of first pair. |
| 14. Maxilla. | 18. Foot of fifth pair. |

Ectocyclops rubescens, ♀, p. 124.

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| Fig. 19. Seen from above. | Fig. 20. Antennule. |
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PLATE VII.

Ectocyclops rubescens, ♀, p. 124.

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| Fig. 21. Antenna. | Fig. 25. Foot of first pair. |
| 22. Maxilla. | 26. Foot of third pair. |
| 23. Anterior footjaw. | 27. Foot of fifth pair. |
| 24. Posterior footjaw. | |

Attheyella natalis, ♀, p. 124.

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| Fig. 28. Seen from left side. | Fig. 31. Foot of first pair. |
| 29. Antennule. | 32. Foot of third pair. |
| 30. Antenna. | 33. Foot of fifth pair. |

Cypris aratra, p. 125.

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| Fig. 34. Shell seen from left side. | } × 50. | Fig. 37. The same more highly magnified. |
| 35. Shell seen from above. | | 38. Post-abdominal ramus. |
| 36. Extremity of second foot. | | |

Cypris ornata, p. 126.

- Fig. 39. Extremity of second foot.

Cypris castanea, p. 125.

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| Fig. 40. Outline of shell seen from right side. | Fig. 41. Outline of shell seen from above. |
| | 42. Extremity of second foot. |

PLATE VIII.

Cypris castanea, p. 125.

- Fig. 43. Post-abdominal ramus.

Cypris inermis, p. 125.

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| Fig. 44. Shell seen from right side. | Fig. 47. Antenna. |
| 45. Shell seen from above. | 48. Extremity of second foot. |
| 46. Posterior extremity of young shell. | 49. Post-abdominal ramus. |

Stenocypris perarmata, p. 126.

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| Fig. 50. Shell seen from right side. | Fig. 55. Maxilla, spiniferous tooth more highly magnified. |
| 51. Shell seen from above. | 56. Extremity of second foot. |
| 52. Antenna. | 57. Apex of post-abdominal ramus. |
| 53. Mandible (chewing-end). | |
| 54. Maxilla of first pair. | |

Stenocypris chevreurii, p. 127.

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| Fig. 58. Shell seen from left side. | Fig. 61. Post-abdominal ramus. |
| 59. Shell seen from above. | 62. Group of marginal setæ of the same. |
| 60. Antenna. | |

Macrothrix affinis, p. 127.

- | | |
|-------------------------------|------------------------|
| Fig. 63. Seen from left side. | Fig. 65. Post-abdomen. |
| 64. Antennule. | |